

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 14 June 2001 (14.06.01)	
International application No. PCT/SE00/01754	Applicant's or agent's file reference 110011201
International filing date (day/month/year) 08 September 2000 (08.09.00)	Priority date (day/month/year) 10 September 1999 (10.09.99)
Applicant LINDER, Hans et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

05 April 2001 (05.04.01)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

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NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

RILTON, Kristina
Stockholms Patentbyrå Zacco AB
Box 23101
S-104 35 Stockholm
SUÈDE

Date of mailing (day/month/year) 14 June 2001 (14.06.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 110011201	
International application No. PCT/SE00/01754	International filing date (day/month/year) 08 September 2000 (08.09.00)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address RILTON, Kristina AB Stockholms Patentbyrå, Zacco & Bruhn Box 23101 S-104 35 Stockholm Sweden	State of Nationality	State of Residence
	Telephone No. 46 8 729 95 00	
	Facsimile No. 46 8 31 83 15	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address RILTON, Kristina Stockholms Patentbyrå Zacco AB Box 23101 S-104 35 Stockholm Sweden	State of Nationality	State of Residence
	Telephone No. 46 8 729 95 00	
	Facsimile No. 46 8 31 83 15	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
---	---

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 110011201	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/SE 00/01754	International filing date (<i>day/month/year</i>) 8 Sept 2000	(Earliest) Priority Date (<i>day/month/year</i>) 10 Sept 1999
Applicant ABB AB et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (See Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 1

☐ as suggested by the applicant.

☐ None of the figures.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01754

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H01H 9/20, H01H 9/28, H01H 9/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H01H, H02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5196658 A (LANCE GULA), 23 March 1993 (23.03.93), column 1, line 37 - line 50; column 2, line 22 - column 3, line 10; column 3, 4/ line 57 - column 6, line 16, column 8, line 50 - column 9, rad 52	1,4-9
Y	--	2,3,10-15
Y	DE 3025174 A1 (FELTEN & GUILLEAUME CARLSWERK AG), 28 January 1982 (28.01.82), abstract	3,15
	--	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

13 December 2000

Date of mailing of the international search report

20-12-2000

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Irma Bornhede/MN

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01754

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5477016 A (PIERRE BEGINSKI ET AL), 19 December 1995 (19.12.95), column 1, line 1 - column 2, line 2; column 2, line 25 - column 4, line 19, figures 1,4, abstract --	2,10-14
A	US 5700985 A (KENNETH M FISCHER ET AL), 23 December 1997 (23.12.97), see whole document -- -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

04/12/00

International application No.

PCT/SE 00/01754

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	5196658	A	23/03/93	AU 646564 B AU 1713192 A	24/02/94 03/12/92
DE	3025174	A1	28/01/82	NONE	
US	5477016	A	19/12/95	DE 69405022 D,T EP 0612087 A,B ES 2107775 T FR 2701617 A,B	29/01/98 24/08/94 01/12/97 19/08/94
US	5700985	A	23/12/97	NONE	

RECORD COPY

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

POE 00 / 0 1 7 5 4

International Filing Date

08 -09- 2000

The Swedish Patent Office
PCT International Application

Name of receiving Office and PCT International Application

Applicant's or agent's file reference

(if desired) (12 characters maximum)

110011201

Box No. I TITLE OF INVENTION

Method and device for interlocking

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

ABB AB

SE-721 83 VÄSTERÅS
Sweden

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

Sweden

State (that is, country) of residence:

Sweden

This person is applicant for the purposes of:

☐ all designated States

☒ all designated States except the United States of America

☐ the United States of America only

☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

LINDER, Hans
Grottvägen 26
SE-771 41 LUDVIKA
Sweden

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

Sweden

State (that is, country) of residence:

Sweden

This person is applicant for the purposes of:

☐ all designated States

☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

RILTON, Kristina
AB STOCKHOLMS PATENTBYRÅ, Zacco & Bruhn
Box 23101, SE-104 35 STOCKHOLM, Sweden

Telephone No.

+46 8 729 95 00

Facsimile No.

+46 8 31 83 15

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III		FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS	
<i>If none of the following sub-boxes is used, this sheet is not to be included in the request.</i>			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i> BORG, Ulf Saxhyttevägen 17 SE-770 14 NYHAMMAR Sweden		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality: Sweden	State (i.e. country) of residence: Sweden		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality:	State (i.e. country) of residence:		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality:	State (i.e. country) of residence:		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality:	State (i.e. country) of residence:		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.			

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the FCT (if other kind of protection or treatment desired, specify on dotted line).....

National Patent (if other kind of protection or treatment desired, specify on dotted line):


- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MZ Mozambique |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TZ Tanzania |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KE Kenya | |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |
| <input checked="" type="checkbox"/> LR Liberia | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☒ BZ Belize
- ☒ BT Bhutan
- ☐
- ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

08-09-2000

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: * regional Office	international application: receiving Office
item (1) 10 September 1999 10/9/99	9903246-8	SE		
item (2)				
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)				
<i>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</i>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
ISA / SE		Date (day/month/year)	Number	Country (or regional Office)
		10/9/99	99/01217	SE
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets:		This international application is accompanied by the item(s) marked below:		
request	:5 ✓	1. <input checked="" type="checkbox"/> fee calculation sheet		
description (excluding sequence listing part)	:4 ✓	2. <input type="checkbox"/> separate signed power of attorney		
claims	:2 ✓	3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: PGF 3460/99		
abstract	:1 ✓	4. <input type="checkbox"/> statement explaining lack of signature		
drawings	:6 ✓	5. <input type="checkbox"/> priority document(s) identified in Box No VI as item(s):		
sequence listing part of description		6. <input type="checkbox"/> translation of international application into (language):		
		7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material		
		8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form		
		9. <input checked="" type="checkbox"/> other (specify): List of representatives, copy of ITS		
Total number of sheets: 18 ✓				
Figure of the drawings which should accompany the abstract: Fig.		Language of filing of the international application: Swedish		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).				
Stockholm, 8 September  Joakim Grip Representative of the applicant				

For receiving Office use only		08-09-2000	
1. Date of actual receipt of the purported international application:		2. Drawings:	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		<input checked="" type="checkbox"/> received:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):		<input type="checkbox"/> not received:	
5. International Searching Authority (if two or more are competent): ISA / SE	<input type="checkbox"/>	6. Transmittal of search copy delayed until search fee is paid	

For International Bureau use only	
Date of receipt of the record copy by the International Bureau:	17 OCT 2000

Supplemental box*If the Supplemental box is not used, this sheet should not be included in the patent.*

1. *If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular.*
 - (i) *If more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is country) of residence if no State of residence is indicated below:*
 - (ii) *If, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant:*
 - (iii) *If, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicated the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor:*
 - (iv) *If, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;*
 - (v) *If, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent addition" or "certificate of addition" or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application:*
 - (vi) *If, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicated for each additional earlier application the same type of information as required in Box No. VI:*
 - (vii) *If, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.*
2. *If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.*
3. *If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures of exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.*

CONTINUATION OF BOX IV:**Further representatives:**

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 Bernhult, Lennart
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 Westerlund, Örjan
 Åström, Elsa

07-11-2000

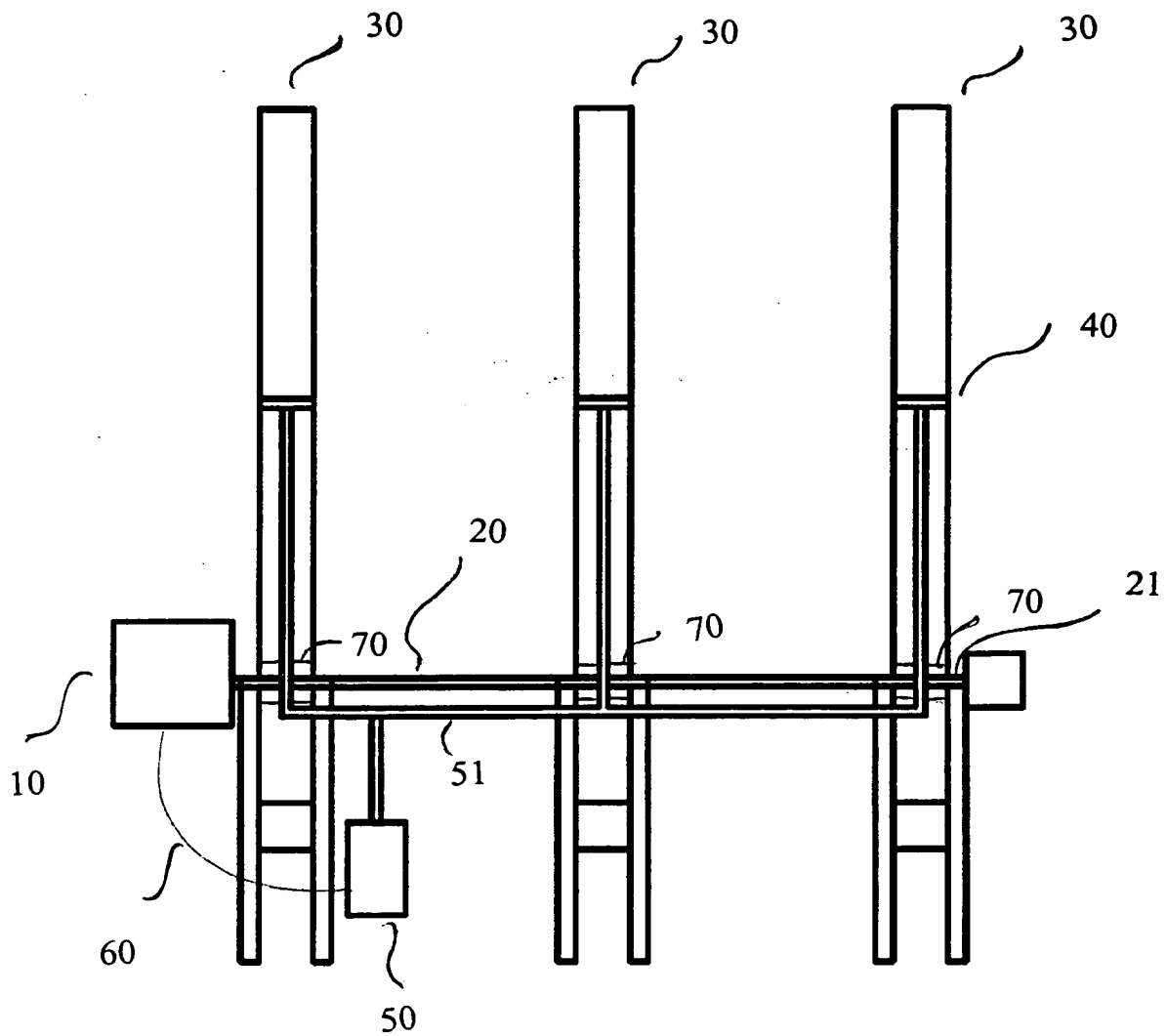


Fig. 1

07 -11- 2000

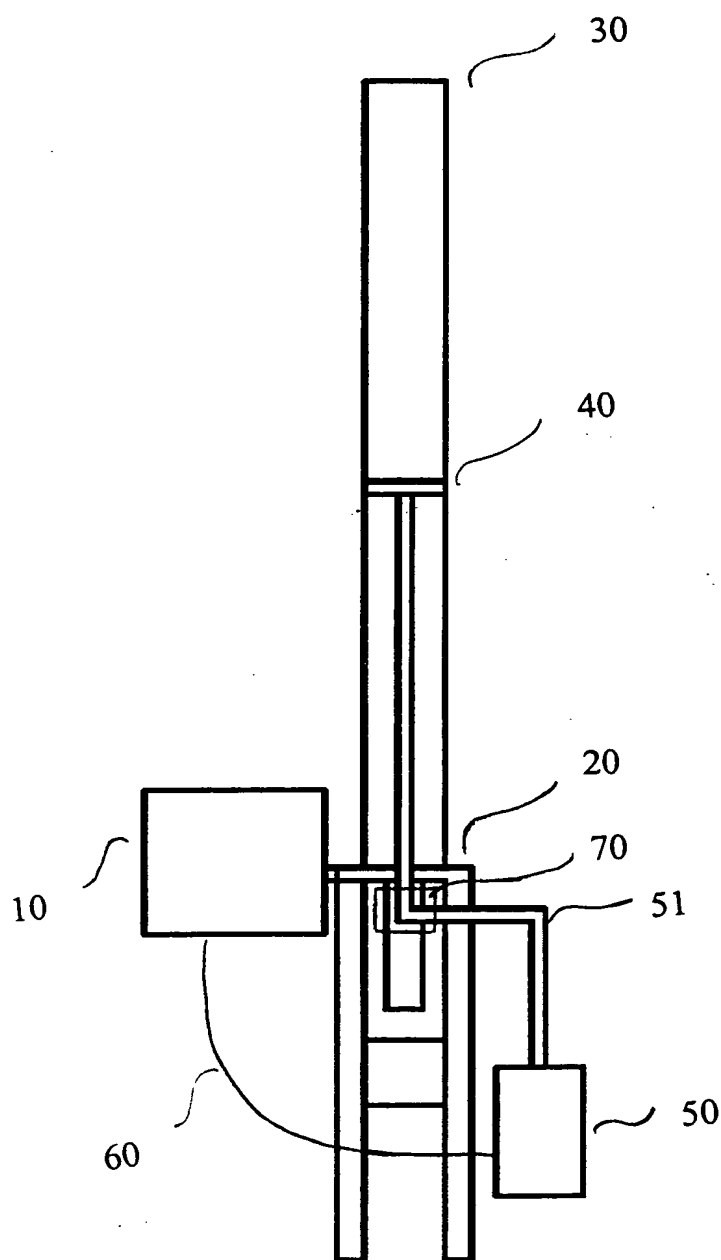


Fig. 2

07-11-2000

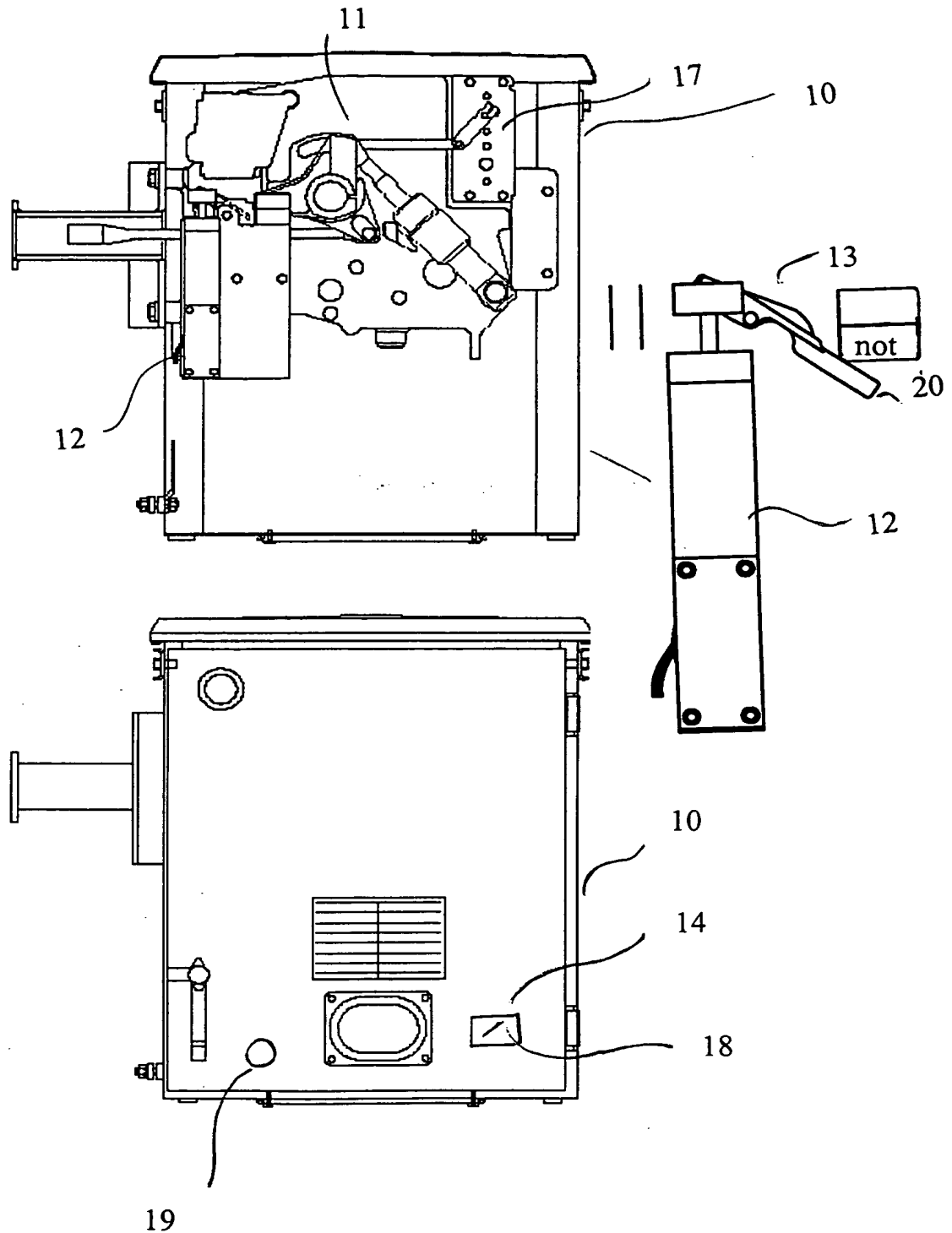


Fig. 3

07-11-2000

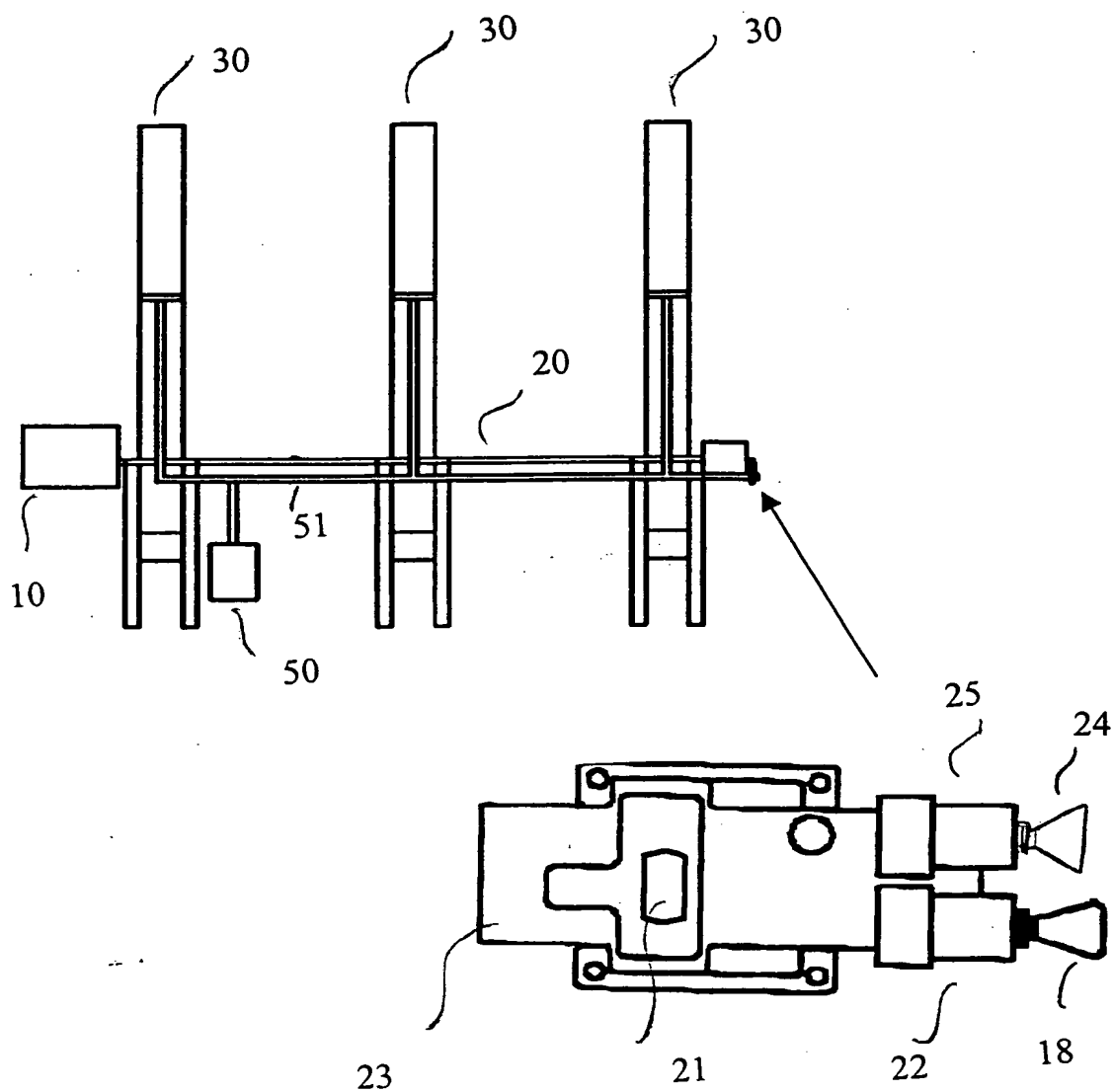


Fig. 4

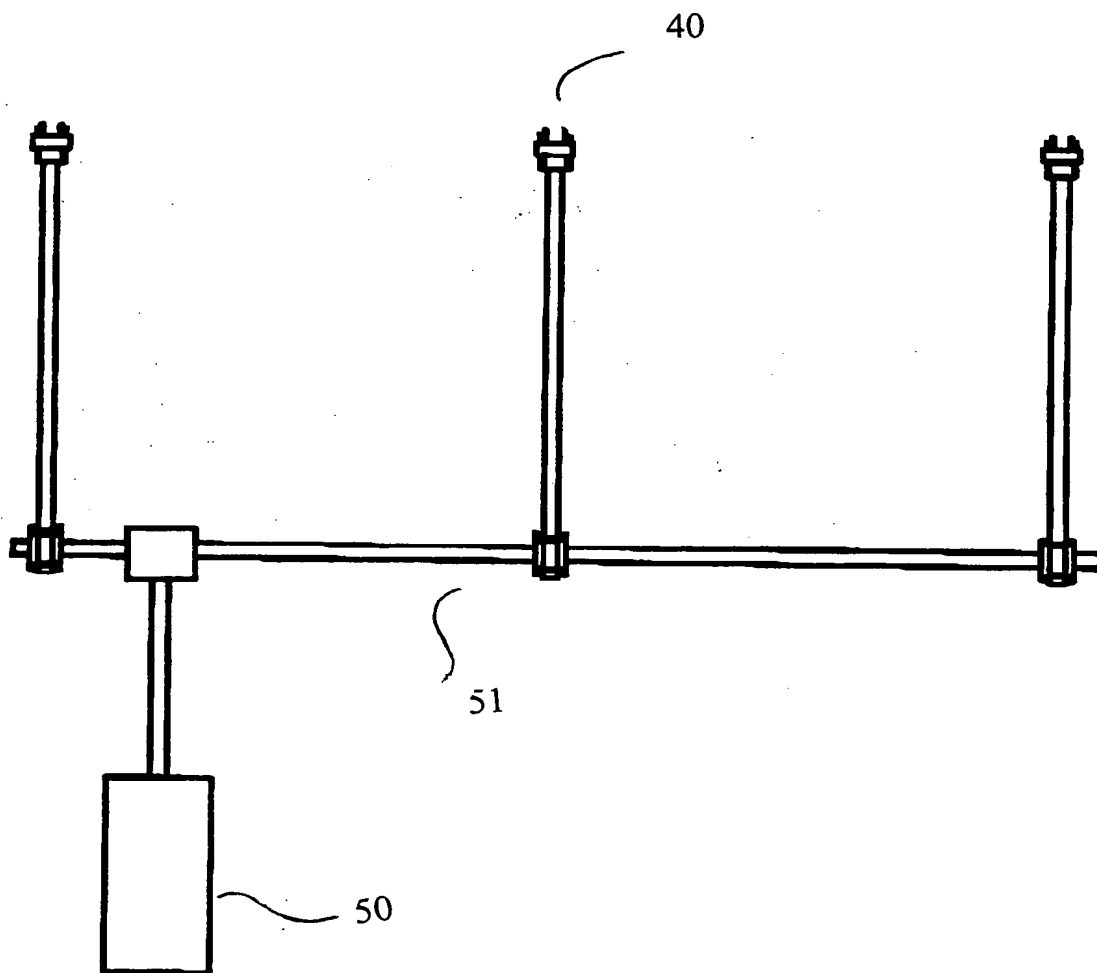


Fig. 5

07 -11- 2000

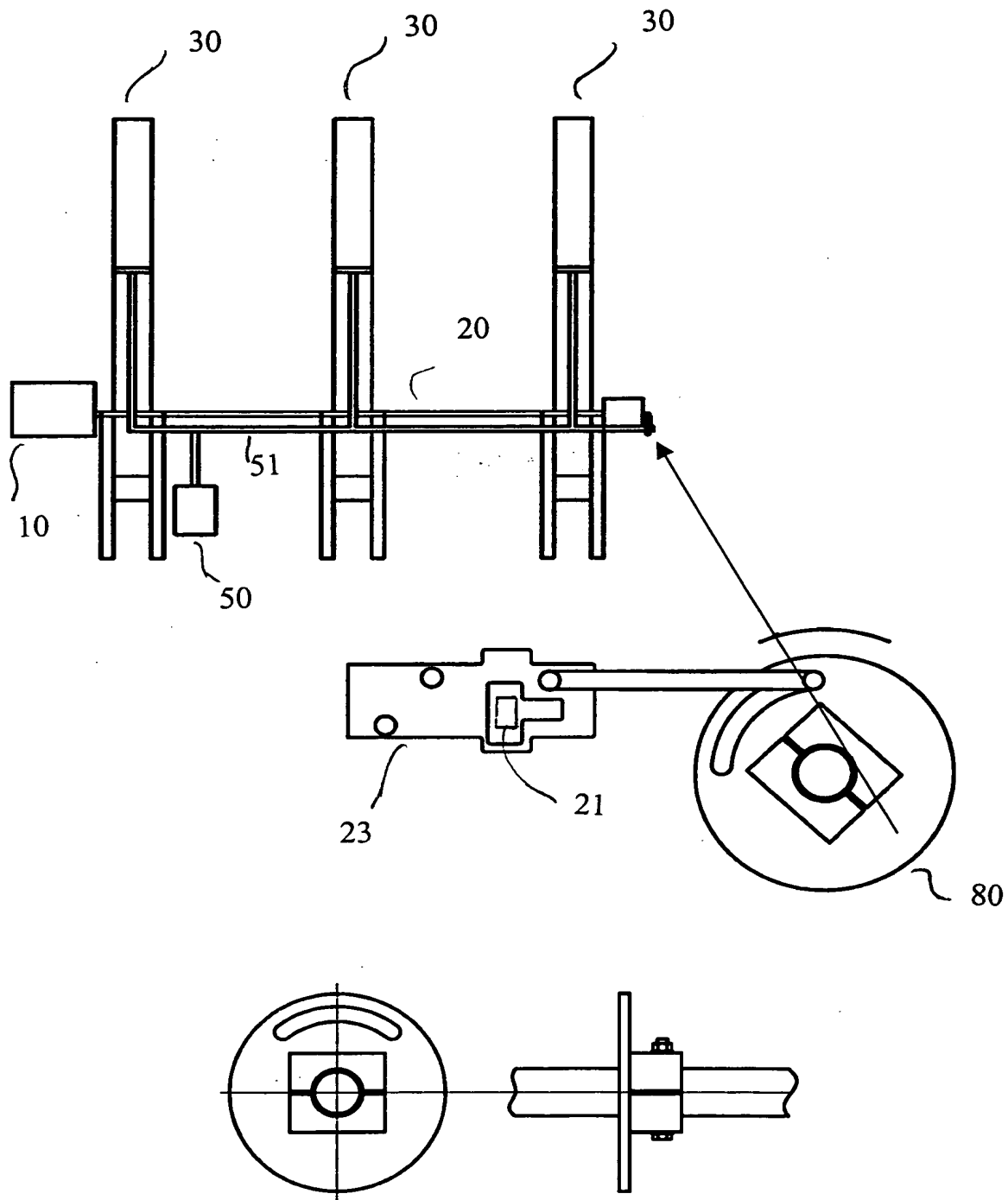


Fig. 6

SÄTT OCH ANORDNING VID FÖRREGLING

Tekniskt område

Föreliggande uppfinning hänför sig till ett sätt och en anordning för att förregla en fränksiljande brytare.

5

Teknikens ståndpunkt

Tidigare har säkerhetsföreskrifter krävt en fränksiljare med visuellt öppet isolationsavstånd vid arbete vid exempelvis högspänningsställverk. Enligt traditionell lösning har en brytare och en fränksiljare tillsammans säkerställt att den del av en anläggning där arbete skall utföras är bortkopplad. Denna typ av lösning kräver minst en, ofta två, fränksiljare med krävande underhåll för att säkerställa korrekt funktion. Varje fränksiljare skall installeras korrekt med utrymmeskrävande fundament och kostsam installationstid. Föreliggande uppfinning avser att lösa de ovan nämnda problemen. Syftet är att tillhandahålla en säkerhetsmässigt tillförlitlig kompakt lösning som är enkel att tillverka och kostnadseffektiv för kunden. Konstruktionen medger tillverkning av delarna enligt känd teknik.

15

Sammanfattning av uppfinningen

Föreliggande uppfinning hänför sig till ett sätt och en anordning för att förregla en fränksiljande brytare. Enligt nya regler har det tidigare kravet på visuellt öppen fränksiljare ersatts med krav på tillförlitlig indikering av fränkopplad anläggningsdel.

20

Vid förregling av en en- eller mångpolig fränksiljande brytare, som innefattar ett länksystem, ett s.k. stängsystem, för till- och fränslag av brytarens kontakter, förreglas först brytarens manöverdon både elektriskt och mekaniskt. Då brytaren är i sitt öppna läge utgör avståndet mellan brytarens kontakter isolationssträcka för fränksiljarfunktionen. Den elektriska och mekaniska förreglingen av manöverdonet indikeras såväl elektriskt som mekaniskt.

25

Förreglingen av brytarens manöverdon åstadkoms med hjälp av ett elektromagnetiskt spärrdon vilket kan manövreras med ett handmanövrerat nyckel- och låsdon. Spärrdonet kan i en föredragen utföringsform även manövreras fjärrstyrt. Manövreringen av det handmanövrerade nyckel- och låsdonet styr i en föredragen utföringsform en elektromagnet som förreglar ett spärrpaket hos brytarens manöverdon genom att dels bryta manöverströmmen till spärrpaketet, dels blockera spärrpaketet mekaniskt. Nyckeldonet frigörs från låsdonet efter förreglingen av brytarens manöverdon och används i ett andra

30

låsdon för mekanisk förregling av stångsystemet med hjälp av ett blockerdon. Stångsystemet låses i förreglat läge med ett andra nyckeldon och ett tredje låsdon. Förreglingen av stångsystemet visas med minst en indikator.

Enligt en utföringsform av uppfinningen används det andra nyckeldonet med ett
5 fjärde låsdon för frigörande av ett blockerdon, vilket möjliggör manövrering av jordkniv eller motsvarande jorddon. Efter att jordkniven anslutits till brytaren blockeras jordkniven i anslutet läge och låses med den andra nyckeldonet och det fjärde låsdonet.

Den elektriska och mekaniska förreglingen av brytarens manöverdon kan i en föredragen utföringsform åstadkommas med ett fjärrmanövrerat förreglingsdon. Den
10 fjärrmanövrerade förreglingen av brytarens manöverdon visas av elektriska och mekaniska indikatorer på brytaren samt av indikatorer på fjärrmanövreringsdonet. Det fjärrmanövrerade förreglingsdonet innefattar manövrering av blockeringsdon för jordkniv, varefter jordknivens rörelse medför förregling av stångsystem. Systemet enligt uppfinningen är säkerhetsmässigt mycket tillförlitligt genom att förreglingarna i en föredragen utföringsform utförs med
15 nyckelutbyten, och att elektriska och mekaniska indikatorer på olika sätt visar att brytaren är förreglad.

Kortfattad beskrivning av ritningsfigurer

Fig. 1 visar en principskiss över en fränksiljande brytare för trefasssystem.

20 Fig. 2 visar en principskiss över en fränksiljande brytare för enfasssystem.

Fig. 3 visar ett manöverdon för manövrering av brytare.

Fig. 4 visar förregling av stångsystemet med blockerskiva och lås.

Fig. 5 visar manöverdon för jordkniv samt förregling av jordkniv med blockeringsdon försett med lås.

25 Fig. 6 visar förregling av stångsystem vid fjärrmanövrering.

Detaljerad beskrivning av föredragna utföringsformer

Fig. 1 visar en principskiss av en fränksiljande brytare för tre poler. Ett manöverdon
10 styr ett länksystem, s. k. stångsystem, 20 vilket sammankopplar polerna samt styr läget på brytarens 30 kontakter. På varje pol indikeras läget på brytarens 30 kontakter, t ex med en mekanisk pil 70. En jordkniv 40 styrs av ett eget manöverdon 50 vilket står i direkt elektrisk förbindelse med manöverdonet 10 genom en kabel 60 kopplad mellan manöverdonen. Vid
30 förregling av den fränksiljande brytaren förreglas först manöverdonet 10 såväl elektriskt som

mekaniskt med hjälp av en elektromagnet 12. Därefter förreglas brytarens 30 stångsystem 20 mekaniskt. Indikeringen åstadkoms i en föredragen utföringsform elektriskt med en lampa och mekaniskt med t ex en pil. Nyckel- och låsdon är i en föredragen utföringsform Castellås med tillhörande nycklar. När såväl manöverdonet 10 som stångsystemet 20 är förreglat
5 möjliggörs manuell manövrering och låsning av jordkniven 40 enligt känd teknik.

Fig. 2 visar en principskiss av en frånskiljande brytare för en pol. Ett manöverdon 10 styr ett länksystem, s. k. stångsystem, 20 vilket styr läget på brytarens 30 kontakter. Läget på brytarens 30 kontakter indikeras, t ex med en mekanisk pil 70. En jordkniv 40 styrs av ett eget manöverdon 50 vilket står i direkt elektrisk förbindelse med manöverdonet
10 10 genom en kabel 60 kopplad mellan manöverdonen. Vid förregling av den enpoliga frånskiljande brytaren förreglas brytaren enligt samma princip som vid förregling av den trepoliga frånskiljande brytaren.

Fig. 3 visar manöverdonet 10 för manövrering av stångsystemet 20 och därmed brytarens 30 läge vilket innefattar ett spärrpaket 11 vilket styr brytarens 30 läge samt en
15 elektromagnet 12 försedd med en mekanisk låsbygel 13 eller motsvarande don. Då en första nyckel 18 i låset 14 vrids om släpper elektromagneten 12 varvid manöverströmmen till spärrpaketet 11, vilket används för manövrering av stångsystemet och därmed brytaren, bryts. Under förutsättning att brytaren är i läge FRÅN fälls en bygel 13 fram och blockerar mekaniskt manövrering av spärrpaketet 11 från läge FRÅN till läge TILL. Indikering av att
20 manöverdonet är förreglat åstadkoms t ex genom att en grön lampa på manöverdonets utsida tänds samt att en mekanisk pil 16 inne i manöverdonet pekar mot ett grönt fält. En hjälpkontakt 17 indikerar brytarens läge. Då brytaren är FRÅN och manöverdonet är förreglat skickas en signal från hjälpkontakten 17 via kabeln 60 till jordknivens manöverdon 50. Detta är ett av villkoren som måste vara uppfyllt för att möjliggöra manövrering av
25 jordkniv. Om brytaren är i läge TILL då manöverdonet förreglas kan i en föredragen utföringsform brytaren automatiskt kopplas över till FRÅN läge. I en föredragen utföringsform kan brytarens manöverdon förreglas med brytaren i läge TILL. Indikering 70 visar då att brytaren är i läge TILL. Manövrering av jordkniv är ej möjlig i detta läge då detta kräver en signal från hjälpkontakten 17 via kabeln 60 till jordknivens manöverdon.

Fig. 4 visar en del av ett länksystem, ett s.k. stångsystem 20, för manövrering av brytarens 30 kontakter. Stångsystemet 20 är försett med en rörlig del 21 vilken är i ett inre läge då brytaren är TILL och ett yttre, synligt läge då brytaren är FRÅN. Genom att med
30

läge då brytaren är TILL och ett yttre, synligt läge då brytaren är FRÅN. Genom att med den första nyckeln 18 vrida om ett andra lås 22 möjliggörs manuell manövrering av en blockerskiva 23, eller annat blockerdon. Blockerskivan 23 skjutes i sidled och låses fast med en andra nyckel 24 i ett tredje lås 25 så att den rörliga delen 21 och därmed stångsystemet 20 låses i sitt yttre läge. Stångsystemets förregling indikeras t ex med en pil.

Fig. 5 visar jordkniven 40 med dess manöverdon 50. Jordknivens läge styrs av ett länksystem 51.

Fig. 6 visar stångsystemets utformning då fjärrmanövrerad förreglad används. Jordknivens rörelse medför rörelse av blockerskivan 23 via en vridbar skiva 80.

Patentkrav

- 5 1. Sätt vid förregling av en brytare för en enpolig eller mångpolig mekanisk elkopplare, som innefattar länksystem för anslutning av polerna, k ä n n e t e c k n a t a v att brytarens manöverdon förreglas både elektriskt och mekaniskt, varvid den elektriska och mekaniska förreglingen indikeras både elektriskt och mekaniskt medelst respektive indikatorer.
- 10 2. Sätt enligt krav 1, k ä n n e t e c k n a t a v att den elektriska och mekaniska förreglingen av brytarens manöverdon åstadkoms medelst handmanövrerat nyckel- och låsdon.
3. Sätt enligt krav 2, k ä n n e t e c k n a t a v att manövreringen av nyckel- och låsdonet frisläpper ett elektromagnetiskt spärrdon som förreglar ett spärrpaket hos
- 15 brytarens manöverdon.
4. Sätt enligt krav 2, k ä n n e t e c k n a t a v att den elektriska och mekaniska förreglingen av brytarens manöverdon utförs med brytaren i öppet läge, varvid avståndet mellan kontakterna utgör isolationssträcka för fränskiljarfunktion.
5. Sätt enligt krav 2, k ä n n e t e c k n a t a v att den elektriska och mekaniska
- 20 förreglingen av brytarens manöverdon utförs med brytaren i slutet läge, varvid det handmanövrerade nyckel- och låsdonet åstadkommer automatisk ändring av brytaren från slutet till öppet läge, varvid avståndet mellan kontakterna utgör isolationssträcka för fränskiljarfunktion.
6. Sätt enligt något av kraven 4 eller 5 k ä n n e t e c k n a t a v att nyckeldonet
- 25 friges från låsdonet efter förreglingen av brytarens manöverdon och används i ett andra låsdon för mekanisk förregling av länksystemet med hjälp av ett blockerdon, vilken förregling låses av ett andra nyckeldon med ett tredje låsdon.
7. Sätt enligt krav 6, k ä n n e t e c k n a t a v att förreglingen av länksystemet visas medelst minst en indikator.
- 30 8. Sätt enligt krav 6, k ä n n e t e c k n a t a v att det andra nyckeldonet används med ett fjärde låsdon för mekanisk upplåsning av manöverdon för jordkniv eller motsvarande jorddon, vilket fjärde låsdon, efter att jordkniven anslutits till brytaren, låses med det andra nyckeldonet och det fjärde låsdonet.

9. Sätt enligt krav 2, k ä n n e t e c k n a t av att den elektriska och mekaniska förreglingen av brytarens manöverdon utförs med brytaren i slutet läge varvid nyckeldonet spärras i låsdonet efter förreglingen av brytarens manöverdon.

5 10. Sätt enligt krav 1, k ä n n e t e c k n a t a v att den elektriska och mekaniska förreglingen av brytarens manöverdon åstadkoms medelst ett fjärrmanövrerat förreglingsdon.

11. Sätt enligt krav 10, k ä n n e t e c k n a t a v att den fjärrmanövrerade förreglingen av brytarens manöverdon visas av elektriska och mekaniska indikatorer på manöverdonet samt av indikatorer på fjärrmanövreringsdonet.

10 12. Sätt enligt krav 10, k ä n n e t e c k n a t a v att den elektriska och mekaniska förreglingen av brytarens manöverdon utförs med brytaren i öppet läge, varvid avståndet mellan kontakterna utgör isolationssträcka för fränksiljarfunktion.

15 13. Sätt enligt krav 12, k ä n n e t e c k n a t a v att förreglingsdonet innefattar mekanisk manövrering av blockeringsdon för jordkniv, varefter jordknivens rörelse medför förregling av länksystem.

14. Sätt enligt krav 13, k ä n n e t e c k n a t a v att förreglingen av länksystemet visas medelst minst en indikator.

20 15. Anordning för förregling av en brytare för en enpolig eller mångpolig mekanisk elkopplare, som innefattar länksystem för anslutning av polerna, innefattande spärrdon för förregling av brytarens manöverdon k ä n n e t e c k n a d a v att den innefattar en elektromagnet vilken vid frisläppande förreglar ett spärrpaket hos brytarens manöverdon både elektriskt och mekaniskt, varvid den elektriska och mekaniska förreglingen indikeras både elektriskt och mekaniskt medelst respektive indikatorer.

Sammandrag

Föreliggande uppfinning hänför sig till ett sätt och en anordning för att förregla en fränskiljande brytare. Vid förregling av en en- eller mångpolig fränskiljande brytare förreglas först brytarens manöverdon både elektriskt och mekaniskt. Då brytaren är i öppet
5 läge utgör avståndet mellan brytarens kontakter isolationssträcka för fränskiljarfunktionen. Den elektriska och mekaniska förreglingen av manöverdonet indikeras både elektriskt och mekaniskt. Därefter förreglas brytarens länksystem mekanisk. Länksystemet låses i förreglat läge. Förreglingen av länksystemet visas med minst en indikator. Förreglingen av brytarens manöverdon och länksystem kan styras manuellt via nyckel- och låsdon eller fjärrstyrt.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

AB Stockholms Patentbyrå
Zacco & Bruhn
Box 23101
104 35 STOCKHOLM

PCT

WRITTEN OPINION

(PCT Rule 66)

PTO/PCT Rec'd 11 MAR 2002

Date of mailing
(day/month/year) **15-08-2001**

Applicant's or agent's file reference

110011201

REPLY DUE

within 60 days
from the above date of mailing

International application No.

PCT/SE00/01754

International filing date (day/month/year)

08.09.2000

Priority date (day/month/year)

10.09.1999

International Patent Classification (IPC) or both national classification and IPC⁷

H01H 9/20, H01H 9/28, H01H 9/16

Applicant

ABB AB et al

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 10.01.2002

Name and mailing address of the IPEA/SE

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Form PCT/IPEA/408 (cover sheet) (January 1998)

I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".

WRITTEN OPINION

International application No.

PCT/SE00/01754

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-15</u>	NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

2. Citations and explanations

Documents cited in the International Search Report:

D1 = US 5 196 658 A
D2 = DE 3 025 174 A1
D3 = US 5 477 016 A
D4 = US 5 700 985 A.

Document D1 discloses an electric operator having a reciprocally mounted actuator, which is adapted to be mechanically coupled to an operating handle from a moulded case circuit breaker. The electric operator includes an electric motor for driving the actuator and a mechanical crank assembly which alternatively allows for manual operation of the actuator.

Document D2 discloses an electromechanical interlock for the switching mechanism of a medium voltage switch. A magnet central armature is used to block switch operation and can be overdriven if required.

Document D3 discloses a circuit breaker equipped with an add-on remote control unit. The circuit breaker comprises a mechanical transmission link independent from the main mechanism, to transmit the position of the movable contact to an indicator, which automatically unlocks a latch in the open position to enable padlocking of a rack.

.../...

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V

Claim 1

The invention defined in claim 1 differs from the cited art in (D1) in that the actuator controls a breaker for a single-pole or multi-pole mechanical switching device.

However, the method to interlock a moulded case circuit breaker both electrically and mechanically, and the indication of that, is disclosed as prior art in D1 (refer to column 4, line 43 - column 5, line 7, column 9, line 47- line 49).

Therefore, it is considered evident that a person skilled in the art, following the teaching of the prior art would arrive at the invention according to claim 1.

Accordingly, the invention defined in claim 1 lacks inventive step.

Claim 15

The invention defined in claim 15 differs from the cited art in (D1) in that the actuator controls a breaker for a single-pole or multi-pole mechanical switching device and includes an electromagnet that on release interlocks a locking package in the actuator. However, the method to interlock a breaker both electrically and mechanically, and the indication of that, is disclosed as prior art in D1 (refer to column 4, line 43 - column 5, line 7, column 9, line 47- line 49). The person skilled in the art, faced with the problem of selecting a device for interlocking a breaker, finds such a device in D2.

Therefore, it is considered evident that a person skilled in the art, following the teaching of the prior art, would arrive at the invention according to claim 15.

Claims 2-14

The features defined in claims 2-14 are, in view of the cited art and general knowledge, considered to be measures obvious to a person skilled in the art.

Accordingly, the invention defined in claims 2-14 lacks inventive step.

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 110011201	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE00/01754	International filing date (day/month/year) 08.09.2000	Priority date (day/month/year) 10.09.1999
International Patent Classification (IPC) or national classification and IPC ₇ H 01 H 9/20, H 01 H 9/28, H 01 H 9/16		
Applicant ABB AB et al.		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of _____ sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application
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Date of submission of the demand 05.04.2001	Date of completion of this report 04.12.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Irma Bornhede/MN Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE00/01754

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE00/01754

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-15</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

1. US 5 196 658 A
2. DE 3 025 174 A1
3. US 5 477 016 A
4. US 5 700 985 A.

Document 1 discloses an electric operator having a reciprocally mounted actuator, which is adapted to be mechanically coupled to an operating handle from a moulded case circuit breaker. The electric operator includes an electric motor for driving the actuator and a mechanical crank assembly which alternatively allows for manual operation of the actuator.

Document 2 discloses an electromechanical interlock for the switching mechanism of a medium voltage switch. A magnet central armature is used to block switch operation and can be overdriven if required.

Document 3 discloses a circuit breaker equipped with an add-on remote control unit. The circuit breaker comprises a mechanical transmission link independent from the main mechanism, to transmit the position of the movable contact to an indicator, which automatically unlocks a latch in the open position to enable padlocking of a rack.

Document 4 discloses the general state of the art.

The invention defined in the claims relates to a method and a device for interlocking a disconnecting breaker. The actuator of the breaker is interlocked both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of respective indicators. .../...

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE00/01754

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V

Since there is no teaching in the prior art that would lead a person skilled in the art to such a method and a device, the invention is not considered to be obvious.

Accordingly, the invention defined in claims 1-15 is novel and considered to involve an inventive step. The invention is industrially applicable.

(19) World Intellectual Property Organization
International Bureau



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(utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility
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HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (utility
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TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

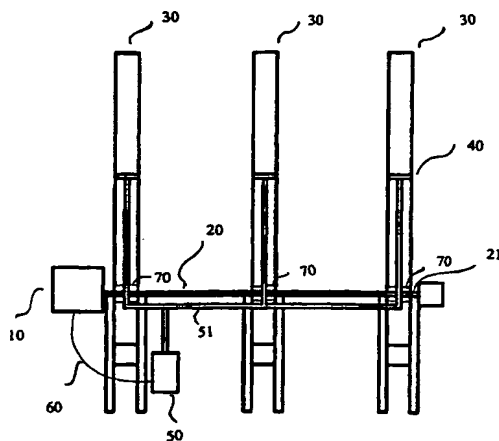
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Published:

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND DEVICE FOR INTERLOCKING



(57) Abstract: The present invention concerns a method and a device for interlocking a disconnecting breaker. During interlocking of a single-poled or multiple-poled disconnecting breaker, the actuator of the breaker is first interlocked both electrically and mechanically. When the breaker is in the open position, the distance between the contacts of the breaker comprises the conductor spacing for the isolation function. The electrical and mechanical interlocking of the actuator is indicated both electrically and mechanically. Subsequently, the link system of the breaker is mechanically interlocked. The link system is locked in the interlocked position. Interlocking of the link system is indicated by at least one indicator. Interlocking of the actuator of the breaker can be controlled manually via a key- and lock device, or remotely.

WO 01/20627 A1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01754

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H01H 9/20, H01H 9/28, H01H 9/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H01H, H02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5196658 A (LANCE GULA), 23 March 1993 (23.03.93), column 1, line 37 - line 50; column 2, line 22 - column 3, line 10; column 3, line 57 - column 6, line 16, column 8, line 50 - column 9, rad 52	1,4-9
Y	--	2,3,10-15
Y	DE 3025174 A1 (FELTEN & GUILLEAUME CARLSWERK AG), 28 January 1982 (28.01.82), abstract	3,15
	--	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01754

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5477016 A (PIERRE BEGINSKI ET AL), 19 December 1995 (19.12.95), column 1, line 1 - column 2, line 2; column 2, line 25 - column 4, line 19, figures 1,4, abstract --	2,10-14
A	US 5700985 A (KENNETH M FISCHER ET AL), 23 December 1997 (23.12.97), see whole document -- -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE 00/01754

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	5196658	A	23/03/93	AU 646564 B AU 1713192 A	24/02/94 03/12/92
DE	3025174	A1	28/01/82	NONE	
US	5477016	A	19/12/95	DE 69405022 D,T EP 0612087 A,B ES 2107775 T FR 2701617 A,B	29/01/98 24/08/94 01/12/97 19/08/94
US	5700985	A	23/12/97	NONE	

METHOD AND DEVICE FOR INTERLOCKING

Technical field

The present invention concerns a method and a device for interlocking a disconnecting breaker.

5

The prior art

Safety regulations have earlier required a disconnecter with a visually open conductor spacing during work on, for example, a high tension switch gear. According to the traditional solution, a breaker and a disconnecter have together ensured that the section of the equipment where the work is to be carried out is disconnected. This type of solution requires at least one, and often two, disconnectors with demanding maintenance in order to ensure their correct function. Each disconnector must be correctly installed with a foundation that requires space and expensive installation time. The present invention is intended to solve the problems described above. The intention is to provide a compact solution, reliable from the point of view of safety, that is simple to manufacture and cost-effective for the customer. The construction permits manufacture of the parts according to known technology.

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Summary of the invention

The present invention concerns a method and a device for interlocking a disconnecting breaker. The earlier requirement for a visually open disconnector has been replaced according to new regulations by the requirement for a reliable indication that the section of the equipment is disconnected.

20

During interlocking of a single- or multiple-poled disconnecting breaker that includes a linkage system, known as a "rod system", for closing operation and opening of the contacts of the breaker, the actuator of the breaker is first interlocked both electrically and mechanically. When the breaker is in the open position, the distance between the contacts of the breaker constitutes the conductor spacing of the disconnecting function. The electrical and mechanical interlocking of the actuator is indicated both electrically and mechanically.

25

The interlocking of the actuator of the breaker is achieved with the aid of an electromagnetic blocking unit that can be operated with a hand-operated key- and lock device. The blocking unit can in one preferred embodiment be operated by remote control. In one preferred embodiment, operation of the hand-operated key- and lock device controls an electromagnet that interlocks a locking package of the actuator of the breaker both by

30

breaking the operating current to the locking package and by mechanically blocking the locking package. The key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the rod system with the aid of a blocking unit. The rod system is locked in the interlocked condition with a second key device and a third lock device. The interlocking of the rod system is indicated by at least one indicator.

According to one embodiment of the device, the second key device is used with a fourth lock device in order to free a blocking unit, which makes it possible to move an earth knife or other earth device. Once the earth knife has been connected to the breaker, the earth knife is blocked in its connected position and locked with the second key device and the fourth lock device.

The electrical and mechanical interlocking of the actuator of the breaker can in one preferred embodiment be achieved with a remote-controlled interlocking device. The remote-controlled interlocking of the actuator of the breaker is indicated by electrical and mechanical indicators on the breaker and by indicators on the remote-control unit. The remote-controlled interlocking device includes the operation of a blocking device for the earth knife, after which movement of the earth knife is accompanied by interlocking of the rod system. The system according to the invention is very reliable from the point of view of safety due to the interlocking in one preferred embodiment being performed by the exchange of keys, and due to electrical and mechanical indicators showing in different ways that the breaker is interlocked.

Brief description of the figures

Fig. 1 shows a sketch of the principle of a disconnecting breaker for a three-phase system.

Fig. 2 shows a sketch of the principle of a disconnecting breaker for a single-phase system.

Fig. 3 shows an actuator for operation of breakers.

Fig. 4 shows interlocking of the rod system with a blocking plate and lock.

Fig. 5 shows an actuator for an earth knife together with interlocking of the earth knife with a blocking unit equipped with a lock.

Fig. 6 shows interlocking of the rod system during remote control.

Detailed description of preferred embodiments

Fig. 1 shows a sketch of the principle of a disconnecting breaker for three poles. An

actuator 10 controls a link system, known as a rod system, 20 which connects the poles together and controls the positions of the contacts 30 of the breaker. The positions of the contacts 30 of the breaker are indicated on each pole, for example with a mechanical arrow 70. An earth knife 40 is controlled by its own actuator 50, which is in direct electrical
5 connection with the actuator 10 through a cable 60 connected between the actuators. When the disconnecting breaker is interlocked, the actuator 10 is first interlocked both electrically and mechanically with the aid of an electromagnet 12. After this, the rod system 20 of the breaker 30 is interlocked mechanically. The indication is achieved in one preferred embodiment electrically with a lamp and mechanically with, for example, an
10 arrow. The key- and lock device in one preferred embodiment is a Castel lock with the associated keys. When both the actuator 10 and the rod system 20 are interlocked, manual operation and locking of the earth knife 40 according to known technology are possible.

Fig. 2 shows a sketch of the principle of an disconnecting breaker for a single pole. An actuator 10 controls a link system, also known as a rod system, 20 which controls the
15 position of the contacts 30 of the breaker. The positions of the contacts 30 of the breaker are indicated, for example, with a mechanical arrow 70. An earth knife 40 is controlled by its own actuator 50, which is in direct electrical connection with the actuator 10 through a cable 60 connected between the actuators. When the single-pole disconnecting breaker is interlocked, the breaker is interlocked according to the same principle as the three-pole
20 disconnecting breaker.

Fig. 3 shows the actuator 10 for control of the rod system 20 and thus the position of the contacts 30, which includes a locking package 11 that controls the position of the breaker 30 together with an electromagnet 12 equipped with a mechanical locking shackle 13 or equivalent device. When a first key 18 is turned in the lock 14, the electromagnet 12
25 releases, whereby operating current to the locking package 11, which is used for control of the rod system and thus the breaker, is interrupted. Under the condition that the breaker is in the OFF position, a shackle 13 is released downwards and mechanically blocks movement of the locking package from the OFF position to the ON position. Indication that interlocking of the actuator is achieved, for example, by the lighting of a green lamp
30 on the external surface of the actuator and by the pointing towards a green field of a mechanical arrow 16 inside the actuator. An auxiliary contact 17 indicates the position of the breaker. When the breaker is OFF and the actuator is interlocked, a signal is sent from the auxiliary contact 17 via the cable 60 to the actuator 50 of the earth knife. This is one of

the conditions that must be satisfied if movement of the earth knife is to be possible. If the breaker is in the ON position when the actuator is interlocked, the breaker can in one preferred embodiment be automatically breakered over to the OFF position. In one preferred embodiment the actuator of the breaker can be interlocked with the breaker in the ON position. The indicator 70 then indicates that the breaker is in the ON position. Movement of the earth knife is not possible in this condition since this requires a signal from the auxiliary contact 17 *via* the cable 60 to the actuator of the earth knife.

Fig. 4 shows part of a link system, known as a rod system, 20 for operation of the contacts 30 of the breaker. The rod system 20 is equipped with a moving part 21 that is in an inner position when the breaker is ON and an outer, visible position when the breaker is OFF. By turning the first key 18 in a second lock 22, manual movement of a blocking plate 23, or other blockage device, is made possible. The blockage plate 23 is pushed in a sideways direction and locked in place with a second key 24 in a third lock 25 such that the moving part 21 and thus the rod system 20 are locked into their outer positions. The interlocking of the rod system can be indicated with, for example, an arrow.

Fig. 5 shows the earth knife 40 with its actuator 50. The position of the earth knife is controlled by a link system 51.

Fig. 6 shows the design of the rod system when remote-controlled interlocking is used. Movement of the earth knife involves movement of the blocking plate 23 *via* a rotatable disk 80.

Claims

1. Method for interlocking a breaker for a single-pole or multiple-pole mechanical switching device that includes a link system for coupling of the poles,
5 c h a r a c t e r i s e d in that the actuator of the breaker is interlocked both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of respective indicators.
2. Method according to claim 1, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a hand-
10 operated key- and lock device.
3. Method according to claim 2, c h a r a c t e r i s e d in that the operation of the key- and lock device releases an electromagnetic blocking unit that interlocks a locking package on the actuator of the breaker.
4. Method according to claim 2, c h a r a c t e r i s e d in that the electrical and
15 mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting.
5. Method according to claim 2, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the
20 closed position, whereby the hand-operated key- and lock device achieves an automatic change of the breaker from the closed to the open position, whereby the distance between the contacts constitutes the conductor spacing for the isolation function.
6. Method according to either of claim 4 or 5, c h a r a c t e r i s e d in that the key device is freed from the lock device following the interlocking of the actuator of the
25 breaker and is used in a second lock device for mechanical interlocking of the link system with the aid of a blocking device, which interlocking is locked by a second key device with a third lock device.
7. Method according to claim 6, c h a r a c t e r i s e d in that the interlocking of the link system is indicated by at least one indicator.
- 30 8. Method according to claim 6, c h a r a c t e r i s e d in that the second key device is used with a fourth lock device for mechanical unlocking of the actuator for an earth knife or equivalent earth device, which fourth lock device, after connection of the earth knife to the breaker, is locked with the second key device and the fourth lock device.

9. Method according to claim 2, characterised in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the key device is blocked into the lock device following the interlocking of the actuator of the breaker.
- 5 10. Method according to claim 1, characterised in that the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a remotely controlled interlocking device.
11. Method according to claim 10, characterised in that the remotely controlled interlocking of the actuator of the breaker is indicated by electrical and
- 10 mechanical indicators on the actuator and by indicators on the remote-control unit.
12. Method according to claim 10, characterised in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting function.
- 15 13. Method according to claim 12, characterised in that the interlocking device includes mechanical movement of a blocking device for an earth knife, after which movement of the earth knife involves interlocking of the link system.
14. Method according to claim 13, characterised in that the interlocking of the link system is indicated by at least one indicator.
- 20 15. Device for interlocking of a breaker for a single-poled or multiple-poled mechanical switching device that includes link systems for connection of the poles, including blocking units for interlocking of the actuator of the breaker
- characterised in that it includes an electromagnet that on release interlocks a locking package in the actuator of the breaker both electrically and mechanically, whereby
- 25 the electrical and mechanical interlocking is indicated both electrically and mechanically by means of the relevant indicators.

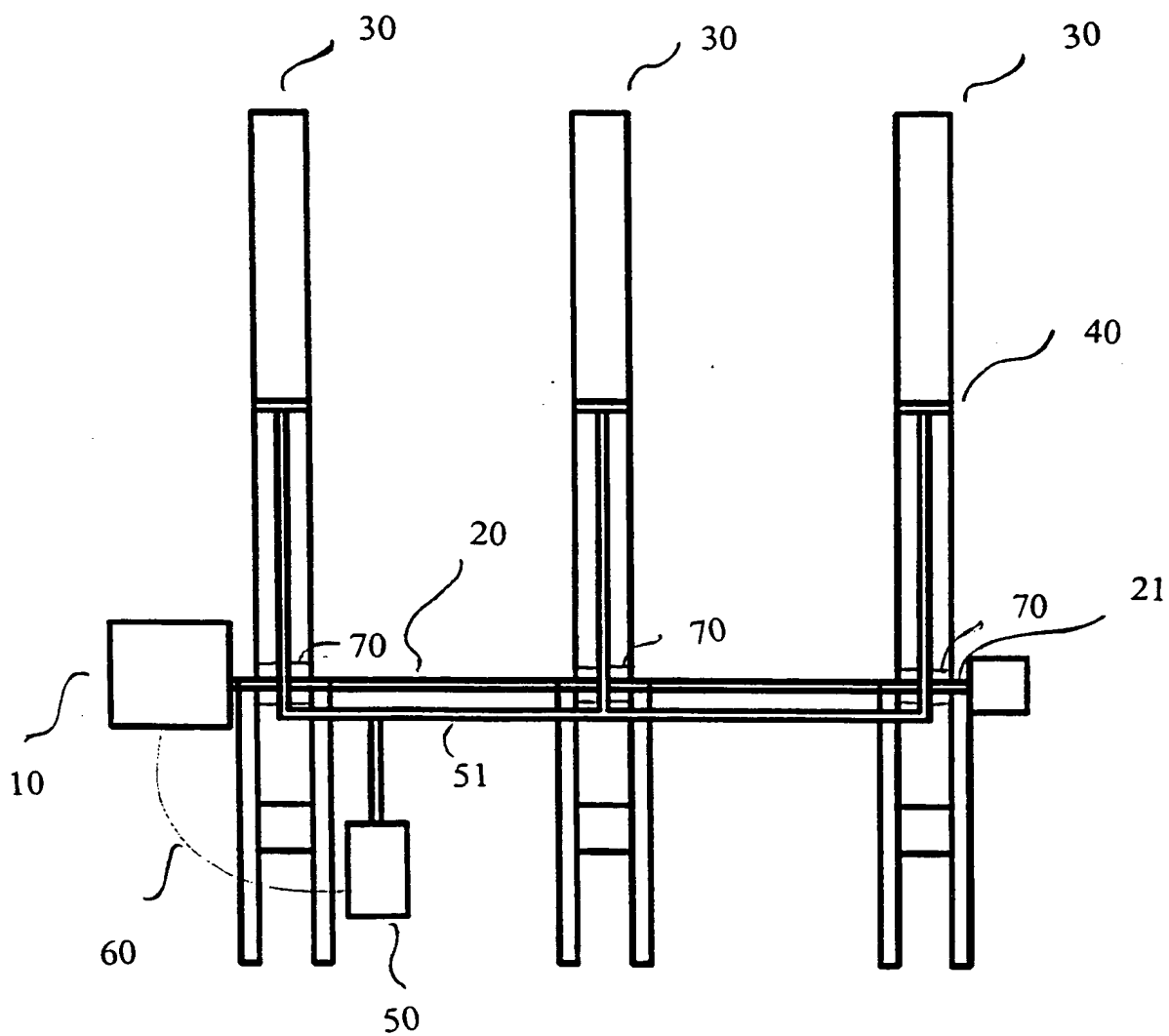


Fig. 1

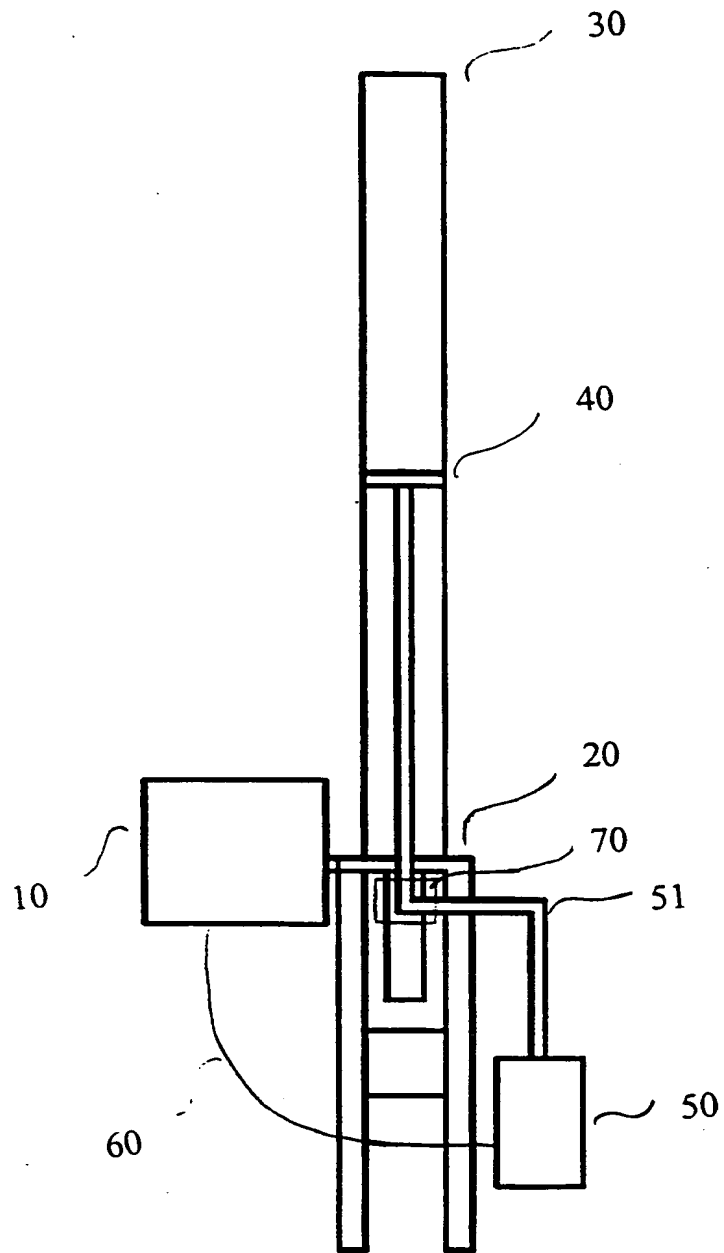


Fig. 2

3 / 6

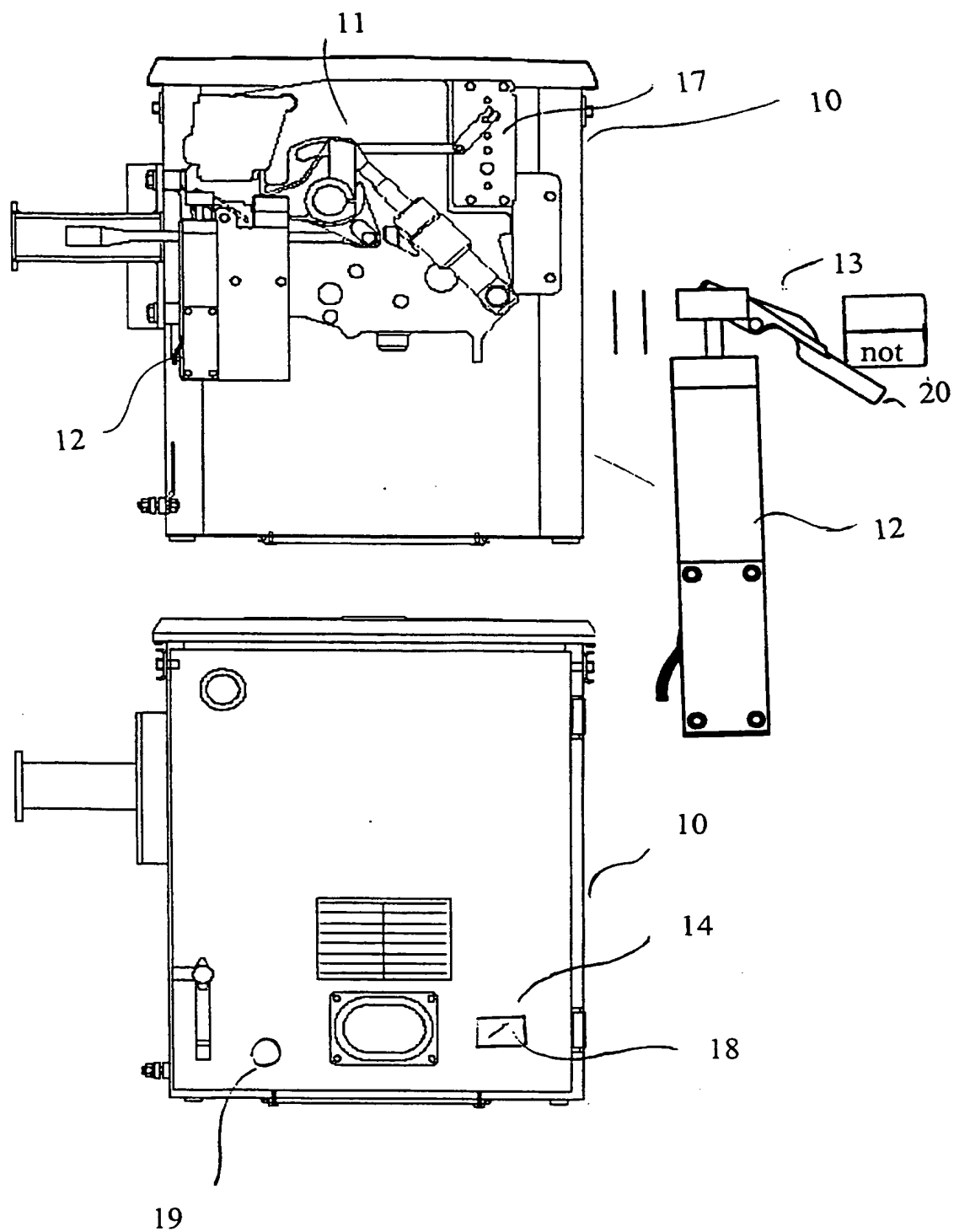


Fig. 3

4 / 6

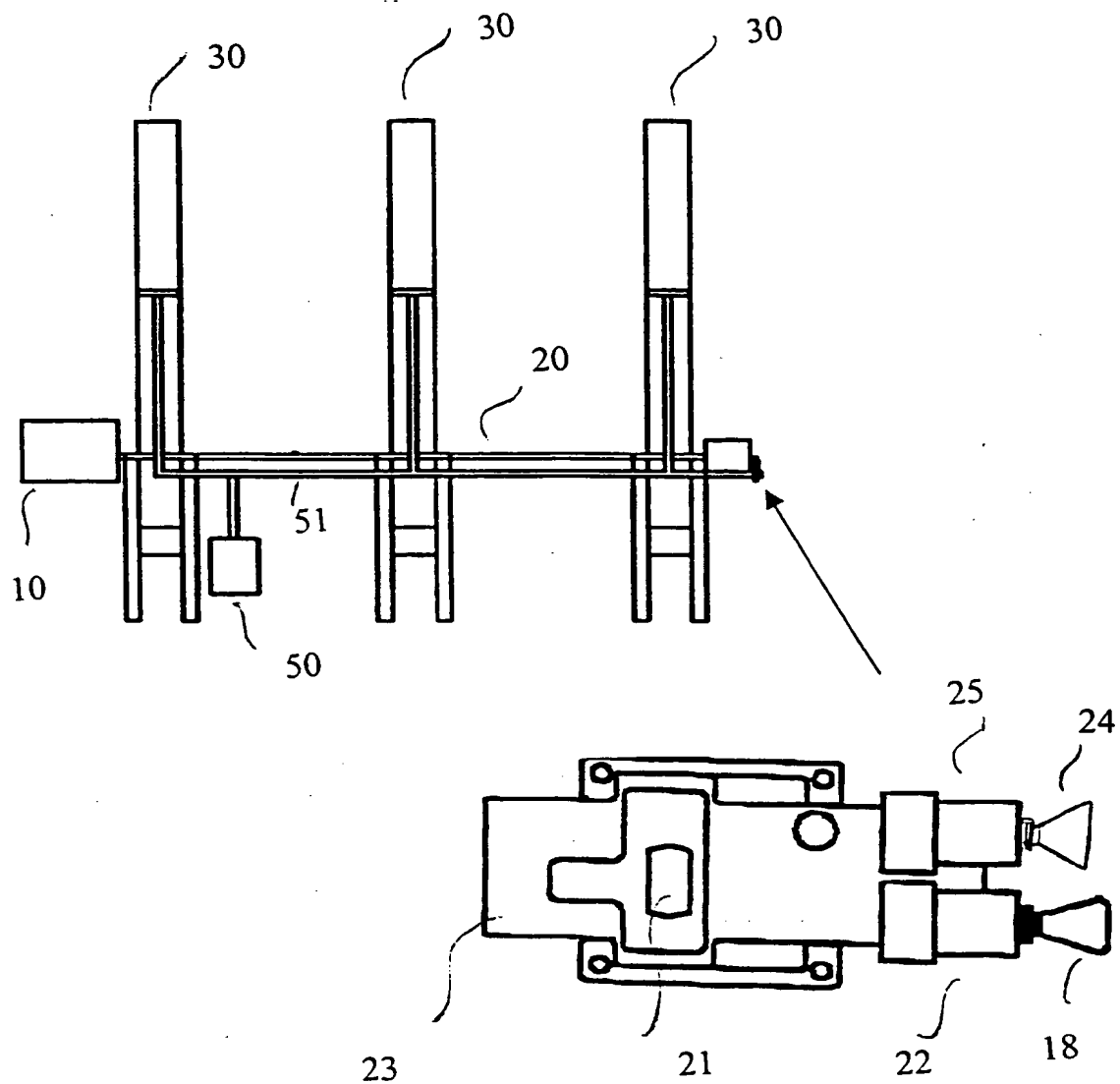


Fig. 4

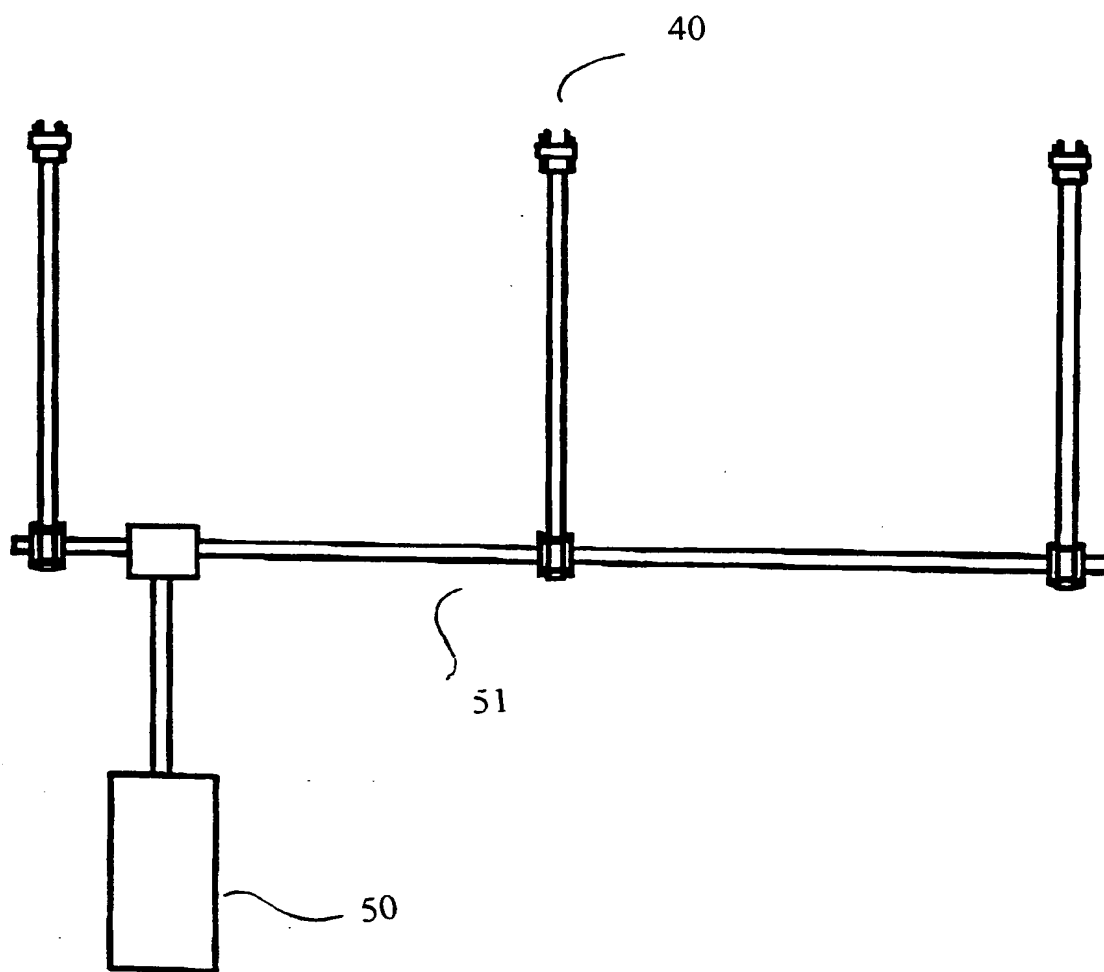


Fig. 5

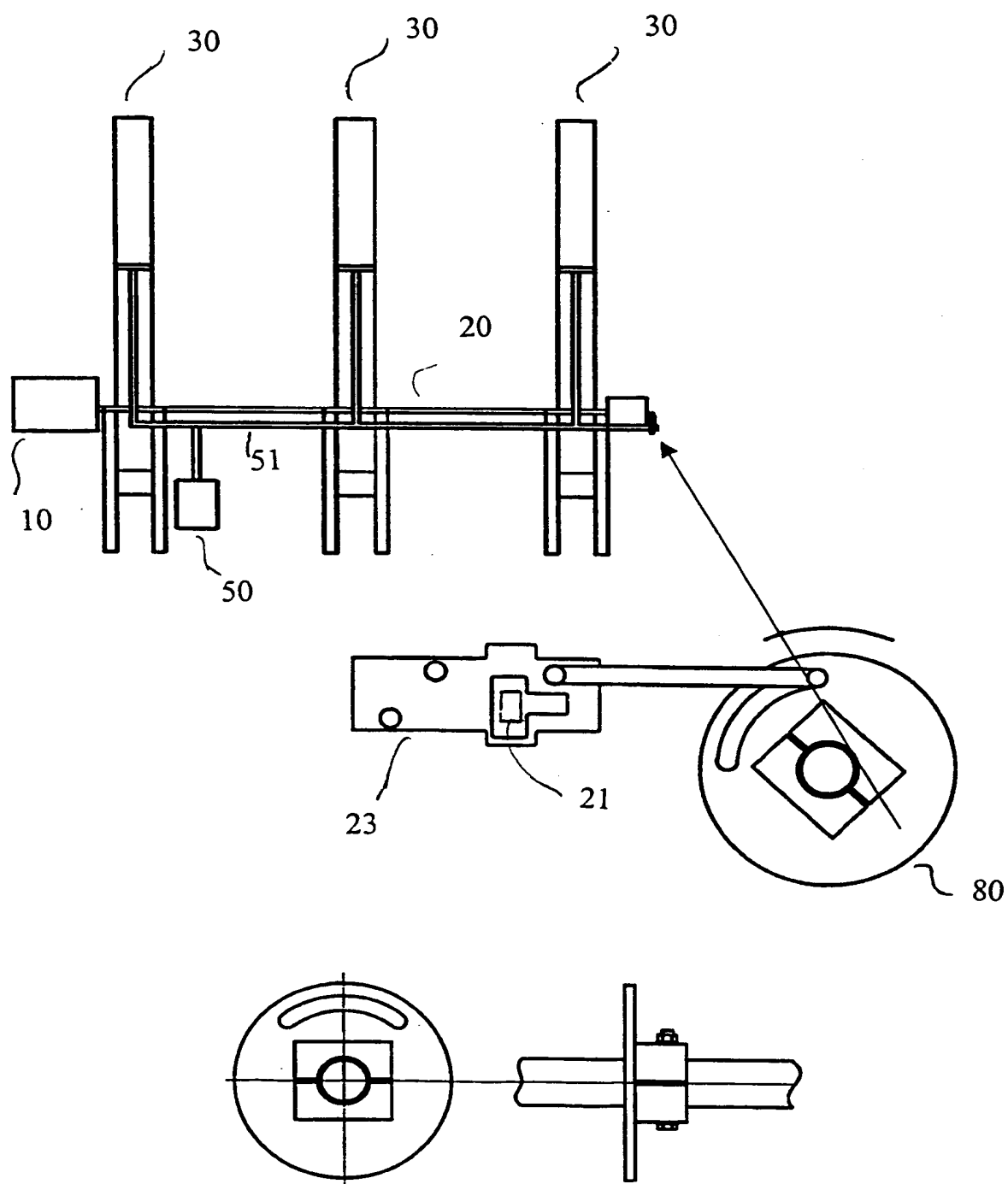


Fig. 6